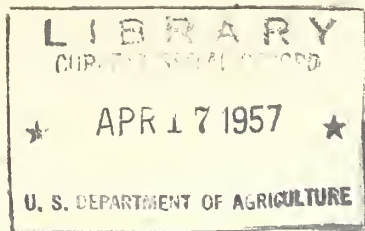


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UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE

PUBLICATIONS AND PATENTS  
OF THE  
EASTERN UTILIZATION RESEARCH BRANCH

January-June 1956

Single copies of available reprints may be obtained on request. At the time this list was prepared, the following, marked (\*), were not available.

989, 990, 991, 992, 993, 996,  
1000, 1001, 1005, 1011, 1013, 1020

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Publications and patents of the Eastern Utilization Research Branch issued before 1951 are listed in AIC-180 and Supplements 1 to 6; publications and patents from 1951 through June 1954 are listed in AIC-320 and Supplements 1 to 6; publications from July 1954 through June 1956 are listed in ARS-73-6 and Supplements 1 to 3.

This list includes an index which covers AIC-180 and supplements, AIC-320 and supplements, and ARS-73-6 and supplements.



JANUARY - JUNE 1956

## PUBLICATIONS

978. Beebe, C. W., Frey, R. W., and Hannigan, M. V.

A COMPARISON OF GAS CHAMBER TESTS OF BOOKBINDING LEATHER WITH A LONG TIME ATMOSPHERIC EXPOSURE. *Journal of the American Leather Chemists Association*, 51, 20-31 (1956).

Twenty-four samples of bookbinding leathers, tanned in various ways, have been exposed as bookbindings to atmospheric pollution for periods of 12 to 19 years. Physical and chemical tests made after exposure correlate reasonably well with gas chamber tests made on the leather before exposure.

979. Beebe, C. W., Rogers, J. S., and Hannigan, M. V.

A COMBINED SOLVENT EXTRACTION AND TANNING PROCESS. *Journal of the American Leather Chemists Association*, 51, 245-251 (1956).

A description is given of a combination tannin extraction and tanning process by the use of acetone, with a saving of time and expense.

980. Beebe, C. W., Rogers, J. S., and Happich, M. L. (EURB), and Simmons, F. C. (Northeastern Forest Experiment Station).

DESTRUCTION OF TANNIN DURING CHEMICAL DEBARKING OF OAK TREES. *Journal of the American Leather Chemists Association*, 51, 266-270 (1956).

Chemical debarking of oak trees with sodium arsenite destroys about 50% of the tannin in the bark.

981. Beebe, C. W., Rogers, J. S., and Luvisi, F. P. (EURB), and Koepp, W. H. (Michigan College of Mining & Technology)

SODIUM ARSENITE AS A DEBARKING AGENT FOR HEMLOCK TREES CAUSES SERIOUS LOSS OF TANNIN IN THE BARK. Forest Products Journal, 6, 38-40 (1956).

Chemical debarking of hemlock trees with sodium arsenite destroys about 30% of the tannin in the bark.

982. Bistline, R. G., Jr., Stirton, A. J., Weil, J. K., and Port, W. S.

SYNTHETIC DETERGENTS FROM ANIMAL FATS. VI. POLYMERIZABLE ESTERS OF  $\alpha$ -SULFONATED FATTY ACIDS. Journal of the American Oil Chemists Society, 33, 44-45 (1956).

The surface active agents sodium allyl  $\alpha$ -sulfopalmitate and sodium allyl  $\alpha$ -sulfostearate were prepared from allyl alcohol and the  $\alpha$ -sulfonated fatty acid. Detergent properties were improved by the presence of builders. Treatment of the esters with potassium persulfate gave a new class of water soluble polymers of possible use as thickening and emulsifying agents.

983. Brice, B. A., and Turner, Arthur, Jr.

GLASS COLOR STANDARDS FOR MAPLE SIRUP. Journal of the Optical Society of America, 46, 293-299 (1956).

New permanent glass color standards for maple sirup, and an improved color comparator for grading maple sirup, are described. Complete spectrophotometric and colorimetric data are given. These standards replace previously used caramel-glycerin solutions as the official color standards of the Department of Agriculture.

984. Eskew, Roderick K.

FRUIT JUICE POWDERS. Chemurgic Digest, 15, 12, 13, 16 (1956).

Orange and grapefruit powders possessing characteristic flavor are now being produced commercially. This has stimulated interest in similar products from other beverage fruit juices such as apple and grape. However, the same drying techniques cannot be used due to the volatility of their aromas. This paper describes the development of a successful continuous process capable of producing excellent apple, grape and cherry juice powder.

985. Eskew, Roderick K., Redfield, Clifford S., Cording, James, Jr., Willard, Miles J., Jr., Claffey, Joseph B., Edwards, Paul W., and Sullivan, John F.

POTATO FLAKES. A NEW FORM OF DEHYDRATED MASHED POTATOES.

III. ESTIMATED COMMERCIAL COST. U. S. Department of Agriculture, Agricultural Research Service, ARS-73-12; 15 pp. (April 1956).

The paper projects pilot-plant production of potato flakes on a single drum drier to commercial operation. Functional specifications and estimated costs for essential pieces of equipment are given. Costs are estimated for commercial production of flakes and the effects of potato costs and solids contents are shown for both bulk and retail packaging.

986. Evans, John D., Waldron, Jerome M., Oleksyshyn, Nadia L. (Temple University), and Riemenschneider, Roy W. (EURD).

POLYUNSATURATED FATTY ACIDS IN NORMAL HUMAN BLOOD. Journal of Biological Chemistry, 218, 255-259 (1956).

The polyunsaturated acids in human blood cells and plasma were determined spectrophotometrically. The cell and plasma fats contain relatively large amounts of tetraenoic, pentaenoic, and hexaenoic acids when compared with usual body depot fats.

987. Everett, A. L., and Cordon, T. C.

RESISTANCE OF PURIFIED COLLAGEN TO DEGRADATION BY SALT-TOLERANT BACTERIA IN PURE CULTURE. Journal of the American Leather Chemists Association, 51, 59-67 (1956).

Salt-tolerant bacteria were isolated from salted hides, screened for action on gelatin and tested for ability to solubilize sterile collagen pieces. A modified chemical (sulfurous acid) sterilization method was safely employed. Degradation was measured by colorimetric estimation of the proportion of hydroxyproline in soluble form. Results showed that carefully purified cowhide collagen was quite resistant to attack by pure cultures in a high salt medium, while conventionally limed collagen was readily degraded. A few selected mixed cultures were moderately active against the purified collagen.



988. Filachione, E. M., and Harris, E. H., Jr.

TANNING STUDIES WITH EPOXY RESINS. Journal of the American Leather Chemists Association, 51, 160-169 (1956).

Epon 562, an epoxy resin which is commercially available, was found to interact with cowhide and calfskin in aqueous systems to produce a tanning effect. Little if any reaction or tanning appeared to take place in the pH range below about six. High pH seemed most suitable for this reaction as regards the rate at which maximum shrinkage temperature (Ts) and reversibility of shrinkage are attained. Treatment with Epon 562 in sodium carbonate, magnesium oxide, or lime water in the presence of sodium sulfate gave the best results. Suitable leather products were obtained from cowhide in 1 to 3 days (Ts 80-85° C) and from calfskin in less than one day (Ts about 85° C). The leather exhibited the unusual property of reversible shrinkage with no visible damage to leather appearance after shrinkage.

- \*989. Ford, T. G., and Alexander, T. D.

CALIBRATION OF A STROBOSCOPIC LIGHT. Journal of Scientific Instruments, 33, 204 (1956).

This short note points out that tuning forks provide a simple and accurate means of calibrating stroboscopic light.

- \*990. Hamdy, M. K., Harper, W. J., and Weiser, H. H. (Ohio State University; work done under Research and Marketing Act contract).

ACIDIC FREE AMINO COMPOUNDS FORMED IN VARIOUS LACTIC ACID STARTER CULTURES AS MEASURED BY ION EXCHANGE CHROMATOGRAPHY. Applied Microbiology, 3, 221-226 (1955).

The proteolytic activities of three species of bacteria used as starters in making Provolone and Romano cheeses were measured in terms of eleven free acidic  $\alpha$ -amino compounds formed in skim milk. The results indicate that each strain or species of starter organism may produce different proteolytic end products when growing alone than when growing in combination with other strains of the same or different species.

In pure culture, *Lactobacillus lactis* and *Lactobacillus bulgaricus* were more proteolytic than *Streptococcus thermophilus*. In mixed cultures, the reverse was true. The results provide a better understanding of the role of starter bacteria in relation to proteolytic changes that occur during the ripening of Provolone and Romano cheeses.



- \*991. Harper, W. J. (Ohio Agricultural Experiment Station; work done under Research and Marketing Act contract).

APPARENT SELECTIVE LIBERATION OF BUTYRIC ACID FROM MILK FAT  
BY THE ACTION OF VARIOUS LIPASE SYSTEMS. *Journal of Dairy Science*, 38, 1391 (1955).

Pancreatic lipase, milk lipase, and glandular lipases prepared from different kinds of animals differed greatly in their abilities to liberate butyric acid from milk fat.

Glandular lipases from lambs, kids, and calves liberated from 2-1/2 to 3 times more butyric acid than did milk lipase, and from 4 to 5 times more than pancreatic lipase. Such differences emphasize the importance of source of lipases used in making Romano cheese.

- \*992. Harper, W. J., and Long, J. E. (Ohio State University; work done under Research and Marketing Act contract).

ITALIAN CHEESE RIPENING. IV. VARIOUS FREE AMINO AND FATTY ACIDS  
IN COMMERCIAL PROVOLONE CHEESE. *Journal of Dairy Science*, 39, 129-137 (1956).

The free amino acids and free fatty acids in 30 commercial Provolone cheeses were measured chromatographically. The free fatty acid content was related to the type of enzyme preparation used in making the cheese, whereas the free amino acid content was related to the species of starter organism.

Cheeses made with purified glandular lipases were as good as or better than those made with crude rennet pastes. The lipases contribute to flavor through the formation of butyric acid.

An interrelationship was noted between the concentrations of free butyric acid and free glutamic acid and the intensity of the desired characteristic flavor. The desired flavor was not detected in cheeses containing less than about 1 mg. of free butyric acid and less than about 2 mg. of free glutamic acid per gram of cheese solids.

- \*993. Harper, W. J., Schwartz, D. P., and El-Hagarawy, I. S. (Ohio State University; work done under Research and Marketing Act contract).

A RAPID SILICA GEL METHOD FOR MEASURING TOTAL FREE FATTY ACIDS IN MILK. *Journal of Dairy Science*, 39, 46-50 (1956).

A silica gel extraction procedure for measuring the total free fatty acids in milk is described. The method requires only 15 minutes instead of 60 minutes as required in previous methods. It is more quantitative than any previous method for measuring free fatty acids in milk, particularly when the acid degrees are greater than 1.5.

Preliminary results indicate that the method may also be used for measuring the free fatty acids in various dairy products as well as those in milk.

- \*994. Heisler, E. G., Hunter, Ann S., Siciliano, J., and Treadway, R. H.

FURTHER STUDIES ON THE PREPARATION OF POTATO GRANULES BY SOLVENT METHODS. *Food Technology*, 10, 276-278 (1956).

In further studies on the dehydration of mashed potatoes by use of alcohol primarily, a special type of distillation and pervaporation were employed. A laboratory procedure is described in which 550 parts of alcohol, of which 541 were recoverable, were used to produce 100 parts of high quality granules from 22% solids potatoes. Most of the water was removed by pervaporation, in which water passed through the wall of a cellophane container more rapidly than the alcohol. The final product was prepared by filtration, evaporation, and drying of the potato solids following the pervaporation step.

995. Herb, S. F., Audsley, M. C., and Riemenschneider, R. W.

SOME OBSERVATIONS ON THE MICROSCOPY OF LARD AND REARRANGED LARD. *Journal of the American Oil Chemists Society*, 33, 189-193 (1956).

A report is presented of observations on the photomicrography of lard, rearranged lard, and some fractions obtained from these fats. Special attention was given to the technique of specimen preparation, controlled conditions of tempering the sample, and photographic reproduction of crystal appearance under polarized light and phase contrast illumination.

\*996 Hoover, Sam R

IMPROVED METHODS OF DAIRY WASTE DISPOSAL. Proceedings of the 25th Annual Institute of Dairying, State College of Washington, 155, (1956).

A review of the laboratory research and pilot-plant development of waste-disposal facilities specifically designed to treat milk-plant wastes by aerobic oxidation.

997. Krewson, C. F., Drake, T. F., Neufeld, C. H. H., Fontaine, T. D., (EURD), and Mitchell, J. W. and Preston, W. H., Jr. (Horticultural Crops Research Branch).

GROWTH REGULATORS. AMINO ACID DERIVATIVES OF 4-CHLOROPHENOXY-ACETIC ACID AND THEIR PLANT-REGULATING EFFECTS IN PRELIMINARY SCREENING TESTS. Journal of Agricultural and Food Chemistry, 4, 140-143 (1956).

Continued interest in elucidating the mode of action of plant-growth modifiers and in compounds having greater selective activity has led to the preparation and evaluation of certain derivatives of amino acids and other plant constituents. A series of new 4-chlorophenoxyacetyl derivatives of D-, L-, and DL-amino acids was prepared and screened for plant-growth modifying activity. In general, the derivatives of DL- and L-amino acids proved to be active plant-growth modifiers when tested on Black Valentine bean, sunflower, cucumber, barley and corn plants; those of D-amino acids were less active and more selective. A notable exception to this generalization was the D-alanine derivative which was as active as the L-isomer. The reason for the high activity of the D-alanine derivative has not been explained, but it is recognized that certain microorganisms are able to utilize D-alanine.

998. Kronman, Martin J., and Stern, Malvin D. (Temple University), and Timasheff, Serge N.

ON THE AGGREGATION OF BOVINE SERUM ALBUMIN IN ACID pH. Journal of Physical Chemistry, 60, 829-831 (1956).

Light scattering and ultracentrifugal measurements have been carried out on deionized and nondeionized solutions of bovine serum albumin in acid pH's. It was found that while the non deionized solutions aggregated readily, the deionized protein aggregated only at the lower pH's (~3) in high salt concentration. The rate and extent of aggregation were erratic. No appreciable dissymmetry was observed with the deionized protein indicating that the associated units are compact.

999. Long, J. E., and Harper, W. J. (Ohio State University; work done under Research and Marketing Act contract).

ITALIAN CHEESE RIPENING.. VI.. EFFECTS OF DIFFERENT TYPES OF LIPOLYTIC ENZYME PREPARATIONS ON THE ACCUMULATION OF VARIOUS FREE FATTY AND FREE AMINO ACIDS AND THE DEVELOPMENT OF FLAVOR IN PROVOLONE AND ROMANO CHEESE.. Journal of Dairy Science, 39, 245-252 (1956).

Cheeses made with purified glandular lipase developed at least as much desired flavor as did cheeses made with crude rennet paste. Enzyme preparations from kids yielded more flavor and more butyric acid in the cheese than did enzyme preparations from calves. Rennet extract, which contains no lipase, did not form either the characteristic flavor or butyric acid.

The formation of free amino acids in cheese was not related to the lipase-containing preparations used in making the cheese.

The appearance of characteristic flavor in Romano cheese was related to the appearance of butyric acid. The flavor was not related to glutamic acid.

This work shows that purified enzyme preparations can be used satisfactorily in place of crude rennet paste to make Italian-type cheeses. This finding is significant because of the questionable sanitary quality of most rennet pastes.

- \*1000. Long, J. E., and Harper, W. J. (Ohio State University; work done under Research and Marketing Act contract).

ITALIAN CHEESE RIPENING.. V.. VARIOUS FREE AMINO AND FATTY ACIDS IN COMMERCIAL ROMANO CHEESE. Journal of Dairy Science, 39, 138-145 (1956).

The amount of free glutamic acid increased as the cheese aged and it was related to the intensity of flavor. Acetic and propionic acids were not related to either the age or flavor intensity of the cheese, but the higher acids and butyric acid were related to the age of the cheese and to the flavor intensities of cheeses of the same age. In general, the free butyric acid and higher fatty acid contents were dependent on the type of lipase preparation used in making the cheese.

Romano cheese contained much greater concentrations of free fatty acids and free amino acids than did Provolone cheese.



- \*1001 Lubert, D. J., and Frazier, W. C. (University of Wisconsin; work done under Research and Marketing Act contract).

MICROBIOLOGY OF THE SURFACE RIPENING OF BRICK CHEESE. Journal of Dairy Science, 38, 981-990 (1955).

To determine which microorganisms in the surface "smear" of Brick cheese are responsible for the characteristic flavor, experimental cheeses were surface-inoculated with different species of micrococci, film yeasts, and *Bacterium linens*, alone and in various combinations.

The micrococci, especially *M. caseolyticus* and to a lesser extent *M. freudenreichii*, produced the characteristic odor and flavor of Brick cheese, whereas the film yeasts and *B. linens* did not. In combination with film yeasts, the micrococci grew better and produced more flavor than in pure culture. The yeasts reduced the acidity of the cheese surface and formed accessory food substances for the cocci. Volatile fatty acids higher than butyric acetic and propionic were found to be responsible for the characteristic flavor.

The use of selected starters, rubbed onto the surface during ripening, should hasten and improve the development of the desired flavor in Brick cheese.

1002. Mininger, Robert F., and Wall, Monroe E.

STEROIDAL SAPOGENINS. XXXII. ATTEMPTED MICROBIOLOGICAL OXIDATION. Archives of Biochemistry and Biophysics, 60, 427-432 (1956).

Attempts were made to hydroxylate sarsasapogenin, diosgenin, and  $\Delta^4$ -tigogenone, using 21 species of bacteria, 15 of yeasts and 38 of molds. None of the organisms on any of the substrates produced a modified sapogenin.

1003. Naghschi, J., and Willits, C. O.

TESTING MAPLE SIRUP FOR CREAMING. U. S. Department of Agriculture Leaflet No. 400, 8 pp. (April 1956).

A simple and rapid method is described for the determination of invert sugar in maple sirup. Application of this method to the control of maple sirups used for making maple cream is discussed.

1004. Ogg, C. L.

REPORT ON MICROANALYTICAL DETERMINATION OF PHOSPHORUS. Journal of the Association of Official Agricultural Chemists, 39, 408-411 (1956).

A report on a collaborative preliminary study of microchemical methods for the determination of phosphorus.

\* 1005. Ogg, C. L.

REPORT ON STANDARDIZATION OF MICROCHEMICAL METHODS. Journal of the Association of Official Agricultural Chemists, 39, 400 (1956).

This report contains the Referee's recommendations to the Association of Official Agricultural Chemists concerning action to be taken on microchemical methods for methoxyl and ethoxyl groups and phosphorus.

1006. Ogg, C. L.

ORGANIC MICROCHEMISTRY. Analytical Chemistry, 28, 766-769, (1956).

A critical review of the literature for 1954-55 covering the more significant articles on quantitative organic microanalysis.

1007. Porges, N.

WASTE TREATMENT BY OPTIMAL AERATION--THEORY AND PRACTICE IN DAIRY WASTE DISPOSAL. Journal of Milk and Food Technology, 19, 34-38 (1956).

Basic concepts as developed from laboratory studies on the disposal of dairy wastes are reviewed and their applications to pilot plant and industrial scale are discussed.

1008. Porges, Nandor, Jasewicz, Lenore, and Hoover, Sam R.

SIMPLE METHOD FOR ESTIMATING OXYGEN VALUE OF WASTES. Industrial Wastes, 1, 95-98, (1956).

The pollution load of dairy and other wastes of organic nature may be determined in the field without accessory heating equipment. Concentrated  $H_2SO_4$  containing 0.0125 N dichromate is the oxidizing solution. The exothermic reaction is allowed to proceed for 15 minutes, after which the degree of oxidation is measured by means of ferrous orthophenanthroline. This is a mild oxidation that approximates the B.O.D. The C.O.D. values are obtained by use of appropriate factors.

1009. Rogers, J. S., and Deebe, C. W.

LEATHER BOOKBINDINGS. HOW TO PRESERVE THEM. U. S. Department of Agriculture Leaflet No. 398, 8 pp. (May 1956).

This leaflet explains the most common causes for deterioration of leather bookbindings, gives some types of leather that resist deterioration, and describes dressings and treatments that aid in the preservation of leather bindings.

1010. Rothman, Edward S., and Wall, Monroe E.

STEROIDAL SAPOGENINS. XXXIII. TRANSFORMATIONS IN THE 12-KETOSTEROID SERIES. Journal of the American Chemical Society, 78, 1744-1747 (1956).

The behavior of steroids with C-12, 20-diketonic substitution cannot be predicted from observations taken on C-11, 20-diketosteroids or on unsubstituted C-ring compounds. The C-12, 20 dicarbonyl interaction affects the reactivity of side chain groups markedly and affects the ease of introduction of new groups into the side chain. New series of  $\Delta^4$ -12-ketopregnenes (seven compounds) and 12-ketopregnanes (three compounds) are prepared and their properties noted. Attempts to prepare 4-pregnene-17  $\alpha$ , 21-diol-3, 12-20-trione by the hecogenin route have not yet been successful.

- \*1011. Sanders, G. P., and Hupfer, J. A. (EURD), and Wiseman, H. G. (Dairy Husbandry Research Branch).

A PHOSPHATASE TEST FOR DETERMINING HEAT TREATMENT OF ALFALFA MEAL. Journal of Dairy Science, 39, 561-567 (1956).

Alfalfa meal of highest nutritive quality, especially high in carotene content, is prepared by heat dehydration. The heat of drying also destroys the phosphatase enzyme. A phosphatase test was therefore developed, a negative test showing heat treatment and indicating high quality. The test is sufficiently sensitive to detect as little as 1% adulteration with nondehydrated (field-cured) product in high-quality, heat-dehydrated meal.



1012. Sanders, G. P., Walter, H. E., and Tittsler, R. P.

GENERAL PROCEDURE FOR MANUFACTURING SWISS CHEESE. U. S. Department of Agriculture, Circular No. 851; 20 pp (Revised August 1955).

Detailed procedures involved in making and curing Swiss cheese are described and illustrated in this circular, which is a revision of a previous edition published in 1950. Also included are a listing of needed equipment; a discussion of the importance of good-quality milk; directions for standardizing the milk; and a discussion of the functions of bacterial starters, with directions for propagating them.

- \*1013. Steyermark, Al, Alber, H. K., Aluise, V. A., Huffman, E. W. D., Jolley, E. L., Kuck, J. A., Moran, J. J., and Ogg, C. L. (Committee for the Standardization of Microchemical Apparatus, Division of Analytical Chemistry, American Chemical Society).

REPORT ON RECOMMENDED SPECIFICATIONS FOR MICROCHEMICAL APPARATUS - ALKOXYL. Analytical Chemistry, 28, 112-115 (1956).

Recommended specifications for an improved Clark type alkoxy apparatus are presented with drawings.

1014. Stirton, A. J., Maurer, E. W., and Weil, J. K.

SYNTHETIC DETERGENTS FROM ANIMAL FATS. VII. DETERGENT COMBINATIONS. Journal of the American Oil Chemists Society, 33, 290-291 (1956).

Sulfated hydrogenated tallow alcohols were found to be the most effective component in detergent combinations with  $\alpha$ -sulfonated hydrogenated tallow acids and sodium dodecylbenzenesulfonate.

1015. Wall, Monroe E., and Serota, Samuel

STEROIDAL SAPOGENINS. XXXIV. PREPARATION OF 3-DESOXYSAPOGENINS (20 $\alpha$  and 20 $\beta$  SERIES). Journal of the American Chemical Society, 78, 1747-1750 (1956).

General and specific methods were developed for the preparation of desoxysarsasapogenin, desoxytigogenin, desoxysmilagenin, and desoxyhecogenin from their corresponding ketones, involving both 20 $\alpha$  and 20 $\beta$  series.

1016. Walter, H. E., Sadler, A. M., Malkames, J. P. and Mitchell, C. D.

A SIMPLIFIED SHORT-TIME METHOD FOR MAKING CHEDDAR CHEESE FROM PASTEURIZED MILK. U. S. Department of Agriculture, Agricultural Research Service, ARS-73-11; 6 pp. (May 1956).

The new method requires only three hours and can be used with conventional equipment, with minor changes in hoops and hooping procedure. The curd is not packed, cheddared, or milled thus greatly reducing hand labor and manufacturing costs.

Two starters are used; the conventional lactic starter, and *Streptococcus durans* which is salt-tolerant.

The cheese develops a good, mild flavor, has an excellent body and texture, is almost free of mechanical openings, and has a uniform volume-to-weight ratio.

1017. Wasserman, Aaron E., Hopkins, William, and Seibles, Thomas S.

GLUCOSE OXIDATION BY *SERRATIA MARCESCENS*. Canadian Journal of Microbiology, 2, 447-452 (1956).

*Serratia marcescens* oxidizes glucose directly, through gluconic acid and 2-ketogluconic acid to an unknown end product. Dried cell preparations dissimilate glucose and gluconate in a 2-stage pattern. At the end of stage 1 1.0 and 0.5  $\mu\text{M}$   $\text{O}_2$  are taken up per  $\mu\text{M}$  of glucose and gluconate respectively. 2-Ketogluconate, determined chromatographically, accumulates. In stage 2, added and metabolically formed 2-ketogluconate are further metabolized. The same final oxidation levels are reached by freeze-dried and fresh cell suspensions, namely 3.0  $\mu\text{M}$   $\text{O}_2/\mu\text{M}$  glucose, 2.5  $\mu\text{M}$   $\text{O}_2/\mu\text{M}$  gluconate, and 2.0  $\mu\text{M}$   $\text{O}_2/\mu\text{M}$  2-ketogluconate. Phosphorylation of the substrates prior to oxidation was shown to be unnecessary.

1018. Watson, Paul D.

A LACTOMETER METHOD FOR DETERMINING THE SOLIDS IN MILK. U. S. Department of Agriculture, Agricultural Research Service, ARS-73-10; 7 pp. (April 1956).

A modified method for the estimation of the solids of milk from Babcock fat determinations and lactometer readings at 102° F. is described. The precision of the method, based on 199 experiments, is discussed. A formula and tables for the calculation of the total solids are presented. The specifications of a special lactometer for use at 102° F. are shown in a drawing.

1019. Whittenberger, R. T., and Hills, C. H.

HOW TO SAFEGUARD THE REDNESS OF STORED CANNED CHERRIES. Food Engineering, 28, 53, 143 (1956).

The red cherry industry makes special efforts to preserve the bright red color of cherries during harvesting and processing. Scant effort is made, however, to prevent the deterioration in redness and flavor that occurs during warehouse storage of the heat-processed product. Our data show that this deterioration may be more serious than that occurring in the pre-warehousing steps. The deterioration may be greatly curtailed by lowering the temperature of warehousing.

- \*1020. Whittier, E. O.

RESEARCH BY FEDERAL AGENCIES ON DAIRY MANUFACTURING. Journal of Dairy Science, 39, 800-803 (1956).

The United States Department of Agriculture first sponsored research on manufactured dairy products about 1902. At first research workers were placed in State Experiment Stations, where cooperative work was carried out on butter, cheese, and the composition of milk. This research was transferred gradually to laboratories of the Dairy Division of the Bureau of Animal Industry in Washington. When the Dairy Division became the Bureau of Dairy Industry in 1924, the research staff became the Division of Dairy Research Laboratories. In 1954, this Division was transferred to the Washington Utilization Research Branch and a year later to the Eastern Utilization Research Branch and designated the Dairy Products Section. Personnel and research activities of the Department of Agriculture concerned with manufactured dairy products since the beginning of the century are discussed.

1021. Willaman, J. J. (EURB), and Wadley, F. M. (Analytical Statistician, Arlington, Va.).

STEROIDAL SAPOGENINS. XXXVII. ASSOCIATION OF SAPOGENINS AND UNSATURATED STEROLS IN AGAVE, DIOSCOREA, AND YUCCA. Archives of Biochemistry and Biophysics, 62, 238-240 (1956).

With Agave, frequencies and average percentages both indicate some negative association of sterols and genins. With Dioscorea, the frequencies indicate the same thing definitely; the data are inadequate to compare average percentages. With Yucca, no such association is indicated.

1022. Willard Miles J Jr Cording, James, Jr , Eskew R K  
Edwards, P W., and Sullivan John F.

POTATO FLAKES A NEW FORM OF DEHYDRATED MASHED POTATOES. REVIEW  
OF PILOT PLANT PROCESS American Potato Journal, 33 28 31  
(1956).

The processing variables in the pilot plant production of dehydrated mashed potatoes using a double drum drier are discussed. A newly developed pre-cooking step makes it possible to improve and control the texture of the final reconstituted product and permits the use of potatoes of lower solids content previously not considered suitable for dehydrated mashed potatoes. A possible explanation of this effect based on a modification of the starch within the cells is advanced. The effects of other factors such as flake thickness density and size, dryness, and selection of raw material are reviewed.

1023. Witnauer, Lee P., Watkins, Nathaniel, and Port, William S

EFFECT OF THE SIZE OF ACYL CHAIN ON COPOLYMERIZATION OF VINYL ESTERS.  
Journal of Polymer Science, 20, 213 214 (1956)

Monomer reactivity ratios for the copolymerization of vinyl stearate and four monomers were determined. These ratios were compared with the  $r$  values culled from the literature for vinyl acetate and the same comonomers. Because these were nearly identical, it was concluded that the size of the acyl chain has no effect on the reactivity in copolymerization of vinyl esters.

1024. Zittle, C. A and DellaMonica, E S

VISCOSITY AND FLOCCULATION OF HEATED  $\beta$ -LACTOGLOBULIN SOLUTIONS:  
EFFECT OF CALCIUM CONCENTRATION AND pH Journal of Dairy Science,  
39, 514-521 (1956).

The effect of calcium concentration, pH, and heat on the physical properties of  $\beta$ -lactoglobulin solutions was investigated. Viscosity, light transmission, and precipitation were measured. The dependence of viscosity on pH and the effect of certain  $\alpha$ -amino group reagents suggested that  $\alpha$ -amino groups assist in the binding of calcium ions. Precipitation in calcium-containing heated  $\beta$ -lactoglobulin solutions was sharply dependent on pH, the lower the pH the smaller the concentration of calcium required. Calcium appears to function in large part to bring about an isoelectric precipitation by neutralizing negatively charged groups. The physical changes observed when milk is heated are discussed in terms of the effect of heat on  $\beta$ -lactoglobulin solutions.



1025. Zittle, C. A., DellaMonica, E. S., Custer, J. H., and Rudd, R. K.

DETERMINATION OF XANTHINE OXIDASE IN MILK WITH TRIPHENYL  
TETRAZOLIUM CHLORIDE. *Journal of Dairy Science*, 39, 522-527 (1956).

A method is described for the determination of xanthine oxidase in milk with triphenyl tetrazolium chloride. The enzymatic reaction is performed with nitrogen gas bubbling through the mixture to avoid oxygen which is inhibitory. Subsequent steps, which include extraction of the color with toluene after acidification with acetic acid, are performed in air since the red, reduced form of triphenyl tetrazolium chloride is stable. The effects of concentrations of substrate and of triphenyl tetrazolium and other factors are investigated. The method is used to show the destruction of xanthine oxidase in skim milk at 55 to 75° C.

1026. Zittle, C. A., DellaMonica, E. S., Custer, J. H., and Rudd, R. K.

THE FAT-GLOBULE MEMBRANE OF MILK: ALKALINE PHOSPHATASE AND XANTHINE  
OXIDASE IN SKIM MILK AND CREAM. *Journal of Dairy Science*, 39,  
528-535 (1956).

The fat globule membrane of milk has been prepared from cream by washing and churning. Physical and chemical properties of this fraction have been correlated with xanthine oxidase and alkaline phosphatase activities. The membrane fraction has been compared with a related fraction obtained from skim milk in behavior in the ultracentrifuge, in filtrability, chemical composition, and enzyme content.

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*Treadway, Robert H., and Heisler, Edward G.*

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*Wood, John W., Fontaine, Thomas D., and Mitchell, John W.*

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